Listing and Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently amended) A method of extracting digital audio data words from a serialized stream of digital audio data, comprising:

constructing a timing window from an estimated bit time for said serialized stream of digital audio data, said timing window having a preamble sub-window and at least one data sub-window;

extracting plural digital audio data words from said serialized stream of digital audio based upon the location of each transition in said serialized stream of digital audio data relative to said preamble sub-window and said at least one data sub-window of said timing window;

each one of said extracted plural digital audio data words having a preamble identifiable by a combination of at least one transition located in said preamble sub-window of said timing window and at least one transition located in said at least one data sub-window of said timing window;

wherein said bit time is estimated by averaging a plurality of data stream pulse lengths.

2. (Previously presented) The method of claim 1, and further comprising identifying said extracted data words as having a first type of preamble if said extracted data words have a pair of successive transitions located in said preamble sub-window followed by a pair of successive transitions located in said at least one data sub-window.

3. (Previously presented) The method of claim 2, and further comprising identifying said extracted data words as having a second type of preamble if said extracted data words have a pair of non-successive transitions located in said preamble sub-window-separated by a pair of successive transitions located in said at least one data sub-window.

4. (Previously presented) The method of claim 3, and further comprising identifying said extracted data words as having a third type of preamble if said extracted data words have a transition located in said preamble sub-window followed by first, second and third transitions located in said at least one data sub-window.

5. (Previously presented) The method of claim 4, wherein said timing window is constructed such that said preamble sub-window extends from about 1¼ times said estimated bit time to about 1¾ times said estimated bit time.

6. (Previously presented) The method of claim 5, wherein said timing window is constructed such that said at least one data sub-window extends from about ¼ times said estimated bit time to about 1¼ times said estimated bit time.

7. (Previously presented) The method of claim 4, wherein said timing window is constructed such that said at least one data sub-window includes a first data sub-window which extends from about ¼ times said estimated bit time to about ¾ times said estimated bit time and a second data sub-window which extends from about ¾ times said estimated bit time to about 1¼ times said estimated bit time.

8. (Original) The method of claim 1, wherein said estimated bit time is derived from said serialized stream of digital audio data.

9. (Original) The method of claim 8, and further comprising:

estimating minimum and maximum bit window times;

constructing a bit window from said minimum and maximum bit window times;

identifying transitions in said serialized stream of digital audio data which occur within said constructed bit window;

wherein the time separating a first set of successive identified transitions is a first measurement of said estimated bit time.

10. (Original) The method of claim 9, and further comprising determining said estimated bit time from a running average of plural measurements of said estimated bit time.

11. (Currently amended) A method of extracting digital audio data words from a serialized stream of digital audio data, comprising:

constructing a timing window from an estimated bit time for said serialized stream of digital audio data, said timing window having a preamble sub-window and at least one data sub-window;

sampling said serialized stream of digital audio data at a fast sample rate; and

extracting plural digital audio data words from said serialized stream of digital audio based upon the location of each transition in said sampled stream of digital audio data relative to said preamble sub-window and said at least one data sub-window of said timing window;

wherein said bit time is estimated by averaging a plurality of data stream pulse lengths.

12. (Original) The method of claim 11, wherein said fast sample rate is at least about twenty times faster than a data rate for said serialized stream of digital audio data.

13. (Original) The method of claim 12, wherein said fast sample rate is derived from a fast clock having a frequency of at least about twenty times faster than the frequency of said serialized stream of digital data.

14. (Previously presented) The method of claim 13, wherein each one of said extracted plural digital audio data words has a preamble identifiable by a combination of at least one transition located in said preamble sub-window of said timing window and at least one transition located in said at least one data sub-window of said timing window.

15. (Previously presented) The method of claim 14, and further comprising identifying said extracted data words as having a first type of preamble if said extracted data

words have a pair of successive transitions located in said preamble sub-window followed by a pair of successive transitions located in said at least one data sub-window.

16. (Previously presented) The method of claim 15, and further comprising identifying said extracted data words as having a second type of preamble if said extracted data words have a pair of non-successive transitions located in said preamble sub-window separated by a pair of successive transitions located in said at least one data sub-window.

17. (Previously presented) The method of claim 16, and further comprising identifying said extracted data words as having a third type of preamble if said extracted data words have a transition located in said preamble sub-window followed by first, second and third transitions located in said at least one data sub-window.

18. (Original) The method of claim 17, wherein said estimated bit time is derived from said serialized stream of digital audio data.

19. (Original) The method of claim 18, and further comprising:

estimating minimum and maximum bit window times;

constructing a bit window from said minimum and maximum bit window times;

identifying transitions in said serialized stream of digital audio data which occur within said constructed bit window, the time separating a set of successive identified transitions being a measurement of said estimated bit time; and

determining said estimated bit time from a running average of plural measurements of said estimated bit time.

20. (Currently amended) A bi-phase decoder for use in decoding a stream of AES-3 digital audio data, comprising:

a decoder circuit coupled to receive a stream of AES-3 digital audio data, an estimated bit time for said stream of AES-3 digital audio data and a fast clock, said fast clock having a frequency of about at least twenty times faster than a frequency of said stream of AES-3 digital audio data; and

a data store coupled to said decoder circuit, said data store receiving subframes of digital audio data extracted, from said stream of AES-3 digital audio data by said decoder circuit;

said decoder circuit extracting subframes of said digital audio data by constructing a timing window from said estimated bit time, sampling said stream of AES-3 digital audio data using said fast clock and applying said sampled stream of AES-3 digital audio data to said timing window to identify transitions, in said sampled stream of AES-3 digital audio data, indicative of preambles of said subframes of digital audio data;

wherein said bit time is estimated by averaging a plurality of data stream pulse lengths.

21. (Previously presented) The apparatus of claim 20, wherein said constructed timing window has a preamble sub-window and at least one data sub-window and wherein preambles of said subframes of digital audio data are indicated by a combination of at least one transition located in said preamble sub-window and at least one transition located in said at least one data sub-window.

22. (Original) The apparatus of claim 21, and further comprising a bit time estimator circuit having an input coupled to receive said stream of AES-3 digital audio data and an output coupled to said decoder circuit, said bit time estimator determining said estimated bit time for output to said decoder circuit.

23. (New) A method of extracting digital audio data words from a serialized stream of digital audio data, comprising:

constructing a timing window from an estimated bit time for said serialized stream of digital audio data, said timing window having a preamble sub-window and at least one data sub-window;

extracting plural digital audio data words from said serialized stream of digital audio based upon the location of each transition in said serialized stream of digital audio data relative to said preamble sub-window and said at least one data sub-window of said timing window;

each one of said extracted plural digital audio data words having a preamble identifiable by a combination of at least one transition located in said preamble sub-window of said timing window and at least one transition located in said at least one data sub-window of said timing window;

estimating minimum and maximum bit window times;

constructing a bit window from said minimum and maximum bit window times;

identifying transitions in said serialized stream of digital audio data which occur within said constructed bit window, wherein the time separating a first set of successive identified transitions is a first measurement of said estimated bit time.

24. (New) A method of extracting digital audio data words from a serialized stream of digital audio data, comprising:

constructing a timing window from an estimated bit time for said serialized stream of digital audio data, said timing window having a preamble sub-window and at least one data sub-window;

sampling said serialized stream of digital audio data at a fast sample rate; and

extracting plural digital audio data words from said serialized stream of digital audio based upon the location of each transition in said sampled stream of digital audio data relative to said preamble sub-window and said at least one data sub-window of said timing window;

estimating minimum and maximum bit window times;

constructing a bit window from said minimum and maximum bit window times;

identifying transitions in said serialized stream of digital audio data which occur within said constructed bit window, the time separating a set of successive identified transitions being a measurement of said estimated bit time; and

determining said estimated bit time from a running average of plural measurements of said estimated bit time.